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ABSTRACT

An instrument was developed and field tested to provide vocational counselors with statewide vocational interest stratification patterns of secondary school youth. Analysis was made of a previously developed prototype that used slides showing workers in situ in order to elicit indications of student interest. Items from this were arranged to produce filmstrip and cassette versions for the Comparative Career Search (CSS); a hand-scorable answer form was developed; and the package was field tested in fifty school systems. Statistical analysis of data produced the necessary test of project objectives and development of student norms. Recommendations for further revision at a later date were made. (Appendixes contain answer forms, both before and after revision, the audio cassette script, correspondence, norm graphs, and a user's manual.) (CP)

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FINAL REPORT

The Normative Study of Indiana Students
Using the Comparative Career Search Test

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Project No. 6-77-D-13

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INFORMATION SHEET

A. Kind of Project: (check one)

1 ☐ Experimental

2 ☒ Developmental

3 ☐ Pilot

4 ☐ Demonstration

5 ☐ Evaluative

6 ☐ Exemplary

B. Population

TYPE

A Disadvantaged

B Handicapped

C Migrant

D Minority

E Combination of the above

F Other 12 through 21 year
old school students

NUMBERS

(affected by project)

A _____

B _____

C _____

D _____

E _____

F 7000

GROUP

1. Pre-school

2. Elementary

3. Junior High School

4. Middle School

5. Senior High School

6. Postsecondary

7. Adult

8. University

9. **Employer**

10. Employee

11. Citizens

12. Parents

13. Combination of the above 2,3,4,5,

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

8 _____

9 _____

10 _____

11 _____

12 _____

13 7000

LOCALITY (check the one which encompasses the locality involved)

a National

b State

c Region

d District

e County

f Area

g Community

h School Corporation (LEA)

a _____

b X

c _____

d _____

e _____

f _____

g _____

h _____

PREFACE

Although this is reported as a final product, it is doubtful that the Comparative Career Search as a useful instrument will ever be considered in "final" form. Each use of the instrument prompts new considerations and possibilities to explore and seek answers.

Throughout this norming process the input and cooperation of many persons provided the only means to accomplish important goals.

I am especially indebted to the individuals in fifty school corporations in Indiana who agreed to take time and student effort in gathering the research data. So important are they to the success of the project that their names and respective school systems are listed in the first appendix to this report.

An equal credit must be given to the staff of the Indiana Career Resource Center for their continuing input and technical assistance: Jan Barcus, Jim Meuninck, Joyce Miller, Sue Montgomery, Betty Morrison and Paul Smith. In addition, Bernie Koziel served as an important translator of raw data into a useful information form. He and Larry Low spoke to the computers and shared their answers in a discernable fashion.

Gerald O. Dudley, Director
Indiana Career Resource Center

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COMPARATIVE CAREER SEARCH NORMATIVE STUDY

I. Statement of the Problem/Purpose

Throughout the middle and secondary school years, students are in some relative progression toward shaping their vocational destinies. It is during this period of life that they need assistance in the identification of those careers in which satisfaction seems most plausible. The choice of a career, or a broad spectrum of occupations in which satisfaction seems optimal, may be aided through the proper use of measures of vocational interest.

In its present state of development, interest measurement uses primarily a paper-and-pencil format. Because of this and other characteristics, interest test users are confronted with the following difficulties:

- a. Reading is a requisite to completion of the test instrument.
Items that must be read oftentimes have a negative effect on poor readers. They might regard interest test taking as synonymous with failing. With the present concern for non-readers high among educators, a format change would be a welcome improvement, and a potential motivator among students with reading problems.
- b. Interest inventories are not normally motivating for test takers and, as such, may produce questionable results. If interest testing formats were to be both informative and intriguing, students would likely find they were more motivated toward completing the instrument accurately.
- c. Many instruments must be machine scored and reported by a central

service. Through this procedure, the time lag between taking and score interpretation lessens considerably the meaning and impact of the results. Immediate feedback of information about the scores is an asset to stimulating the process of career exploration.

- d. Many vocational interest testing sessions are conducted in large groups at scheduled times. Interpretation of the results usually requires similar scheduling and the presence of trained adults. The timing of both events does not normally coincide with the spontaneous need for adolescents to determine and check on their vocational interests. To accomplish a correction of this problem, the test instrument should be as available and usable in the school as the drinking fountain or pencil sharpener.
- e. The basis of prediction used with many interest tests rests on the nature of the normative group used in the test development. With many, that group is made up of samples of students who are contemplating a particular career rather than job incumbents who are "living" the career. Day to day activities, desires, and needs of a sample of the working population may be quite different from the expectations of students who are training to enter the same fields.

It was to these challenges that the development and validation study of a vocational interest survey with audio visual format was directed in 1975-76 (Project #77-75-C, SBVTE). The project sought to nullify the perceived limitations found in other instruments by the development and validation of a 2X2 slide-format survey instrument (VISION) that required picture choosing as a method of item response. Job incumbents were asked

to respond to the survey as well as to provide a job title relating to their selected line of work. They were also requested to complete a paper-and-pencil interest inventory that could be used for comparison with the instrument under development. Through careful preparation and computer analysis using correlational techniques, the results yielded the following findings:

- a. VISION (the original name given to the prototype of the Comparative Career Search instrument) was developed using over 200 color photographs taken of a controlled variety of workers performing specific and representative tasks of their work. No picture was included in the instrument unless three knowledgeable and independent raters totally agreed that the picture represented a job title taken from a list of representative and non-representative titles.
- b. The survey instrument yielded a high degree of correspondence (average $r=.615$) with the Vocational Preference Inventory indicating their common variance seemed to measure the same constructs of vocational behavior. The VPI is a well validated paper-and-pencil instrument which has been extensively used in research and counseling and which was used to establish the occupational typology postulated by John Holland.
- c. The instrument (now called the Comparative Career Search), when completed by the job incumbents in the validation sample, yielded scores that immediately translate into the six Holland categories. The category of highest response was compared to the occupational cluster known to contain the incumbents job

titles in such a way that correlational results occurred.

The CCS results forecasted the cluster significantly (statistical) better than would be expected by chance occurrence (average $r = .398$)

As a result of the validation and a reporting of the findings (VISION, 1976) several recommendations were made. These recommendations, in part become the research questions to be answered in this project. Since the validation study disclosed that the instrument had utility for correctly predicting a job incumbents' family of occupations, it was thought to be appropriate for indicating occupational directions for students to explore.

Recommendations From The Validation Study

1. That an analysis be made of the contribution each of the 120 items (slides) makes to the six sub scales (Holland categories) of the test. Through item analysis, using a biserial correlation technique, items which provide no additional variance to any sub scale could be eliminated (or changed) without significantly altering the results gained from the use of the test.
2. That the items remaining from the item analysis be organized into their most predictive format and prepared as a filmstrip, with a companion audio-cassette prepared, to provide uniformity and pacing to the instructions.
3. That a machine/hand scorable answer sheet be developed for use with large groups of test takers. This answer sheet should be produced so that it would be optimally observable in limited light. Since the pictures are projected

on a screen during testing both the pictures (test items) and answer sheet must be viewable simultaneously.

4. That a large scale norming process be conducted to determine adequate student norms for counselors and students to use. The norms should reflect the stratifications observable among schools and students in the middle and high schools operating in Indiana.

With the suggested changes in format and with knowledge of item/sub-scale correspondence, it should be possible to determine a variety of usable norms from a statewide stratified random sampling of classrooms of students at the middle and high school levels. It is these norms that form the expected outcomes for this project. To insure quality control during the project as well as a targeting on the important research questions to be answered, several objectives were prepared that could be measured through analysis of either data gathered in the validation study or data gathered in this normative project.

II. Statement of Objectives

- A. Rationale for Objective 1: Because the job incumbent results from the validation study were not post-analyzed to determine item/scale relationships, it was not known whether each of the 120 items was contributing any variance to any of the sub-scales or specifically to the sub-scale it purported to represent. Through such an item analysis, only the most powerful items would need to be retained for use without lowering the predictability of the test. With a reduced number of items its com-

pletion time could be shortened.

Objective #1 - Through the use of a specific algorithm, validation data on each of the 120 items of the VISION test will be analyzed to determine the retention or rejection in the Comparative Career Search instrument.

- B. Rationale for Objective 2: As a result of the specific item analysis, perhaps there would evolve a pattern in the data that would suggest the feasibility of a particular sequential arrangement of pictures as is necessary to produce a filmstrip. From comments made by test-takers during the validation study a pattern of appropriate and inappropriate line drawing (contained in each item) might emerge to improve the technical quality of each item. From observations made by the test administrators during the validation study, a pattern of improvements in the directions for taking and scoring might emerge to improve the effectiveness of the instructions when prepared in audio-cassette form.

Objective #2 - Through an analysis of data from item analysis, test taker comments, and test administrators' observations, an arrangement of instructional and test item slides will develop, suitable for filmstrip and audio-cassette production into Comparative Career Search multiple copies.

- C. Rationale for Objective 3: Benefiting from the experience of using a hand scorable, immediate feedback answer sheet during the validation study, certain observations were recorded by test takers and administrators that would improve the format of the answer form. With the knowledge that large groups of respondents would be necessary to develop

usable norms, a machine scorable answer form would be the only practical means to assure accuracy, uniformity, and speed through the data analysis process of norming.

Objective #3 - Through an analysis of observations from persons using the original hand scoring answer form and through the knowledge of the arrangement of items in the filmstrip, a machine scorable answer form will be designed and quantity produced in the tolerance levels required for test scoring machine use.

- D. Rationale for Objective 4: As a result of the validation study and subsequent post-analyses of the data the only comparisons possible with individual test results are raw score comparisons. Knowing the mean and standard deviation of scores for unique groups of job incumbents is not a useful comparison tool for middle and high school students and graduates. A comparison which would be more useful would be norm tables which are developed around the characteristics of the variety of students in Indiana secondary schools.

Objective #4 - Through the careful use of specific sampling techniques a stratified random sample of classrooms of students will yield test results which will be used for developing normative tables for the Comparative Career Search.

III Procedures

The following steps were undertaken as a means of reaching each of the stated objectives. Each specific procedure is shown in relation to the objective to which it belonged.

A. Procedures related to Objective 1.

1. Item/sub scale correlations were first computed using the data

from the 202 respondents to the VISION test items. A biserial correlation coefficient was computed for each of the possible pairs of items and sub scales in the data pool. With 120 items in the test and three choice possibilities for each item (A,B, or ?), 360 potential item responses were available for the computation. With six sub scale test results available in either A, B, or ? totals, 18 sub scales were available to be computed. These computations were completed within the six sub sample groups of job incumbents identifiable by the Holland type cluster in which their job title is located. With all possible correlations generated, an algorithm was developed that assigned weights to items in relation to the predictability the item has for each sub sample of incumbents.

2. The algorithm developed for use as an assignment technique is as follows:
 - a. Any item from the original VISION test item pool was considered for inclusion in the Comparative Career Search instrument if it meets the following psychometric criterion and has a derived weight that is algebraically positive.
 - (1) The correlation is derived with item/sub scale calculation using a minimum of three incumbents.
 - (2) The A responses to any single item for a specific incumbent (Holland type) sub sample should significantly and positively correlate with an A total score of the same type more than does any other incumbent sub sample. Weights assigned to variations are: +6 if an item meets the criterion, +4 if

the correlation is highest for both adjacent (hexagonal codes) codes, +2 if the correlation is highest for only one adjacent code, 0 if the correlation is highest for other than adjacent hexagonal codes or if the correlations are not statistically significant, -4 if the derived correlation is highest for the opposite hexagonal code or if the correlations are negative.

- (3) The B responses to any single item for a specific incumbent sub sample should significantly and negatively correlate with the Total A scores. Weights assigned to variations are: +2 if an item meets the criterion, 0 if it does not.
- (4) The B responses for any single item for a specific incumbent sub sample should correlate significantly and positively higher with Total B sub scales related to the incumbent sub sample than does any other worker sub sample. Weights assigned to variations are: +2 if the item meets the criterion, +1 if the correlation is highest for adjacent codes, 0 if highest for other than adjacent codes or if not significant, -1 if the highest correlation is negative or is for an opposite hexagonal code.
- (5) The ? responses for any single item should have low non-significant biserial correlations with either Total A or Total B sub scores. Weights assigned to variations are: +3 if the item meets the criterion, +2 if the criterion is appropriate for A Total only, +1 if the criterion applies only to B Totals, -1 if the correlation with B Totals are significant, -2 if the correlation with A Totals is significant, and -3 if the significant correlation obtains with

both A and B Total sub scales.

- (6) The total sample (N=202) A responses to each specific item should correlate non-significantly and positively with Total A sub scales, non-significantly with Total B sub scales, and non-significantly with Total ? sub scales. Weights assigned to variations are: +3 if all 3 obtain, +2 if ? is non-significant, and either A or B correlation is significant, +1 if both A and B correlations are significant and ? is not, -1 if ? is significant, -2 if ? and either A or B is significant, and -3 if all three have significant correlations for the Total sample.

- b. Final selection of items was then determined in such a manner that bias was negated toward any significant group of workers or population. This was done by inspection of the items that resulted from the algorithm application.

B. Procedures related to Objective 2.

Written and recalled observations were discussed during advisory group sessions such that item sequencing, item symbols, and administration and scoring directions were planned, pilot tested, replanned, etc. until an appropriate result would emerge which satisfied the suggestions or countered the objections related to VISION use in the validation study. Following these decisions, filming of improved items occurred.

C. Procedures related to Objective 3.

1. The numerous observations, both written and remembered, that occurred during the validation study were directed toward a machine scorable answer sheet design that would capture all variables

necessary for analysis of student responses within all potential strata of the sample to be gathered.

2. A limited review of literature was accomplished to determine the strata variables within which variations of student responses might be expected. This information provided input for locations on the answer sheet where this demographic information might be requested from the test taker.
3. Once the decisions were made about the printing format necessary for machine scorable answer sheets, a source of printers was investigated. The tolerances necessary for data forms scored by an IBM 805 optical scanning device was critical in this decision.

D. Procedures related to Objective 4.

1. The first task to complete was to determine the nature of the universe of junior high and high school classrooms from which a stratified random sample would be drawn. The research section of the Department of Public Instruction provided the necessary data about all Indiana schools so that a control could be developed regarding sampling. Means and standard deviations were developed from the data relating to average daily pupil attendance, adjusted assessed valuation/pupil, and per pupil expenditure for curriculum purposes. Categories or strata for each of these school classification variables were then determined such that nearly equal numbers of the universe of school corporations could be found in each level. The levels for each variables were:

<u>Variable</u>	<u>Code</u>	<u>Size</u>
ADA	1	0-999 Pupils
	2	1,000-2,499 "
	3	2,500-3,999 "
	4	4,000 + "
AV/Pupil	1	\$ 6,999 or less
	2	7,000 - 9,999
	3	10,000 -12,999
	4	13,000 -15,999
	5	16,000 -19,999
	6	20,000 or more
Per Pupil Expenditure	1	\$ 874 or less
	2	875 - 944
	3	945 - 999
	4	1,000 -1,054
	5	1,055 -1,124
	6	1,125 or more

In addition to these variables, students were asked to provide personal data as part of their test answer sheet. These variables included: sex, age, perceived scholastic ability, perceived vocational interest, and perceived personality type. The levels of each variable may be seen in the front top section of the answer form in Appendix B.

2. The second task was to assign a unique number to each school corporation for purposes of random identification. Random numbers were then generated from a table of random digits. This assured the unbiased selection of a school corporation

in the drawn sample. Selection continued until at least two school corporation numbers were identified in each cell of a matrix of cells formed by the variables: Average Daily Attendance Strata, and Adjusted Assessed Valuation per pupil. A flip of a coin identified one of the selected pair for junior high student testing, with the other one gathering high school student test results using the Comparative Career Search.

3. Correspondence with superintendents in the selected schools followed. Having already received a letter about the project, all Indiana superintendents were apprised that their school corporation might be selected for study inclusion. Copies of all correspondence are included as Appendix C. Whenever a randomly selected sample was unable to participate, the table of random digits was again consulted for a replacement and the process was repeated.
4. When the necessary number of schools had provided participation assurance (a total of 13 were unable to participate when initially contacted) instructions were sent to the superintendent's designee describing a random method of selecting four (4) classrooms from which the test data should be secured. Through a post card return, both the number of needed answer sheets and the optimal date for CCS delivery were scheduled. This procedure involved a large volume of personal telephone calls for clarification.
5. Upon return of the completed answer sheets and the CCS tests, the data were reduced to computer cards and submitted for computer analysis to the Indiana University computer system.

The second statistical procedure used with Objective 1, an algorithm, has already been described in detail. Its derivation emerged from inspection of the results of the biserial correlation.

2. Discussion and detailed inspection were the analysis procedures applied to the data and materials available through Objective 2.
3. Discussion and detailed inspection were the techniques available for determining whether Objective #3 was accomplished. The precise tolerances that needed to be met through the printing of the answer forms served as the evaluation procedure for that objective. Only one company that was located was capable of holding the precise tolerances necessary for the IBM 805 Scorer. That company produced the answer forms (NCS DATA Forms of 197-F Greenfield Road, Lancaster, PA 17601.)
4. Objective 4 related data were analyzed by several means: (a) The returned answer forms, having been coded when originally mailed, were inspected to determine whether the original sampling matrix was adequately filled in, thus assuring adequate subjects for computation purposes at all strata levels. (b) Total raw scores were developed for each sub scale (I, II, III, IV, V, VII) using both A and B item responses appropriate to the respective sub scale on the test. These totals (along with ? total scores) were then standardized at each level of every classification variable so that comparison between levels could be conducted. (c) A coefficient of contingency statistic was applied across levels of each classification variable to determine whether

differences appeared between the standardized sets of scores. The test of significance level for these data was set at .001 and beyond.

V. Findings of the Study (Results)

The results of the study will be described in order of the stated Objectives.

A. Objective 1 related findings.

1. Item/sub scale biserial coefficients were computed and subsequently evaluated by the developed algorithm with the result that 72 items of the original 120 were retained for use in the Comparative Career Search instrument.
2. The means and standard deviations, when compared with the 120 item data, are shown in the following tables.

It can be seen from Tables 1 through 6 that although the number of test items has decreased by 40%, from 120 to 72, the relative position of means and standard deviations for each incumbent group has remained static. From these results it appears that the careful screening of item analysis data has produced a more efficient instrument with which to obtain similar interest test results.

B. Objective 2 related findings.

1. Careful detail produced a filmstrip with the qualities determined necessary for quantity production of 50 copies. These copies were prepared by a commercial filmstrip producer, thus assuring the highest quality product.
2. Through the studio narration of a male voice, a properly paced audio-cassette tape was produced in 50 copies.

Table 1

120 Item and 72 Item Means and Standard Deviations for
Respondents from Realistic Work Environments (N=68)

<u>Sub Scale</u>	<u>120 Item</u>		<u>72 Item</u>	
	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>
I	5.43	3.29	3.43	2.18
II	5.65	3.70	3.46	2.33
III	4.25	3.09	3.35	1.94
IV	4.28	3.15	2.71	1.91
V	8.04	3.86	4.57	2.59
VI	10.19	4.88	5.60	2.35

Table 2

120 Item and 72 Item Means and Standard Deviations for
Respondents from Investigative Work Environments (N=30)

<u>Sub Scale</u>	<u>120 Item</u>		<u>72 Item</u>	
	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>
I	5.60	3.23	3.73	2.15
II	5.30	4.41	3.07	2.35
III	6.13	3.05	4.23	1.85
IV	4.70	3.41	2.57	2.05
V	11.76	3.70	6.23	2.80
VI	7.23	4.53	5.13	2.05

Table 3

120 Item and 72 Item Means and Standard Deviations for
Respondents from Artistic Work Environments (N=16)

<u>Sub Scale</u>	<u>120 Item</u>		<u>72 Items</u>	
	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>
I	3.94	1.81	2.88	1.26
II	5.19	2.93	1.50	1.16
III	5.81	2.43	3.25	1.29
IV	13.06	4.45	8.25	2.60
V	5.81	3.69	3.00	2.03
VI	4.81	2.74	3.56	1.63

Table 4

120 Item and 72 Item Means and Standard Deviations for
 Respondents from Social Work Environments (N=38)

Sub Scale	120 Item		72 Item	
	Mean	S.D.	Mean	S.D.
I	5.92	3.55	3.74	2.05
II	5.34	3.31	2.53	1.93
III	7.16	3.42	4.13	2.23
IV	7.55	4.65	4.37	3.11
V	7.16	3.76	4.18	2.52
VI	5.58	3.98	3.97	1.91

Table 5

120 Item and 72 Item Means and Standard Deviations for
 Respondents from Enterprising Work Environments (N=30)

Sub Scale	120 Item		72 Item	
	Mean	S.D.	Mean	S.D.
I	7.40	3.56	4.30	1.99
II	10.20	4.53	5.21	2.69
III	5.77	2.79	4.88	1.85
IV	5.93	3.69	3.54	2.69
V	6.83	3.90	4.82	2.02
VI	7.43	4.98	4.49	2.59

Table 6

120 Item and 72 Item Means and Standard Deviations for
 Respondents from Conventional Work Environments (N=20)

Sub Scale	120 Item		72 Item	
	Mean	S.D.	Mean	S.D.
I	10.30	3.71	5.82	2.92
II	5.45	3.46	4.18	1.91
III	5.10	3.43	4.18	1.55
IV	6.65	4.28	3.47	2.35
V	6.75	4.99	3.41	2.18
VI	5.25	4.18	4.18	2.60

Both 50 and 1000 Hz tones were placed in the tapes for an automatic or manual signal to advance the film-strip. Appendix D contains a script of the narration used in the instruction and scoring portions of the tape.

C. Objective 3 related findings.

1. Through the request for bids to produce answer forms in quantity, a single source was located which guaranteed the ability to hold tolerance on the produced answer sheets. With art work and form design consultation the company was able to produce the answer form in 25,000 copies for use in the project. A test of the product proved its usefulness prior to delivery in normative sites. A copy of the answer form is contained in Appendix B.
2. As a result of market analysis, a suitably sized corrugated plastic box was purchased in quantities of 50 for purposes of mailing the test kit to those who assisted in the norming process.

D. Objective 4 related findings.

1. As a means of determining whether the stratified sampling scheme had achieved the goal of a balanced number of respondents in all cells of the sampling matrix, the following tables were prepared.

Table 7

Sampling Matrix of Respondents by
Sex, Age, and School Size (N=5167)

School Size	Female		Male	
	Age 14 and under	Over 14	Age 14 and under	Over 14
0-999	172	229	164	264
1,000-2,499	268	499	312	565
2,500-3,999	326	234	318	277
4,000 +	363	402	333	441
Totals	1,129	1,364	1,127	1,547
by sex	2,493		2,674	

Table 8

Sampling Matrix of Respondents by Sex, Age,
and Adjusted Assessed Valuation (N=5167)

Adjusted Assessed Valuation	Female		Male	
	Age 14 and under	Over 14	Age 14 and under	Over 14
6,999 or less	243	213	218	330
7,000 or 9,999	128	285	137	331
10,000-12,999	284	334	287	293
13,000-15,999	161	120	170	114
16,000-19,999	114	314	115	350
20,000 or more	199	98	200	129
Totals	1,129	1,364	1,127	1,547
by sex	2,493		2,674	

Table 9

Sampling Matrix of Respondents by Sex,
Age, and Per Pupil Expenditure (N=5167)

Per Pupil Expenditure	Female		Male	
	Age 14 and under	Over 14	Age 14 and under	Over 14
874 or less	238	180	221	258
875-944	290	338	290	396
945-999	117	229	138	251
1,000-1,054	100	271	115	292
1,055-1,124	159	211	159	188
1,125 or more	225	135	204	162
Totals	1,129	1,364	1,127	1,547
by sex	2,493		2,674	

It can be seen from Tables 7 through 9 that the number of students measured through the sampling procedure achieved a reasonable balance across all levels of sex, age, school size, wealth, and educational expenditure. From these results it is more likely that the normative data would show variable level statistical differences, if they existed from the testing.

2. As a method of determining whether differences were evident among test results at different levels of the classification variables, (sex, age, school size, adjusted assessed valuation, and per pupil expenditure) the coefficient of contingency analysis was inspected.

No differences between levels of any variable but sex exceeded the .001 level of confidence established. The responses given and the interest test results produced by boys in the sample were significantly different from those of girls. Appendix E shows a bar graph illustrating this difference across all sub scores of the Comparative Career Search.

3. Three other student provided variables were provided by each of the test respondents and were used to determine whether significant relationships were evident between CCS sub scales and the three variables labeled: perceived ability, perceived work interest, and perceived personality. The respective statements measuring these variables were provided on the answer form under Self Questions. In the assessment of personality the responses to two statements were combined in such a way that they denoted one of four possible quadrants relating to common personality variables.

- a. The following table displays the results of relationship between perceived ability and measured vocational interest:

Table 10
Relationship Between Perceived Scholastic Ability and CCS
Subscale Results for Boys (N=2908) and Girls (N=2504)

	CCS Subscale						
	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	<u>VI</u>	<u>?</u>
Male	.11*	-.05	.11*	.07*	.14*	-.17*	-.03
Female	.05	-.05	.04	.04	.11*	-.02	-.04

* = Significant Person-Product-Moment Correlation Coefficients beyond the .001 level of confidence

For the continuum of choices available to the respondents, Table 10 summarizes the results. Male respondents' test results showed significant relationship between perceived ability and intensity of scores on each of the sub scales except II and ?. On both of these sub scales the correlation was negative.

Males who perceived themselves as more scholastically able were the ones who produced the largest sub scale raw scores and visa-versa. An opposite and significant result is evident for males with sub scale VI. On this variable, males of perceived lower ability scored higher

raw totals than their peers who perceived themselves to be smarter. This scale - relating to skilled, vocational and manual occupations - result is disturbing in that it exposes a bias among Indiana's male students which could be loosely interpreted as, "If you aren't too smart, at least you are probably good with your hands."

Females produced perceived ability and vocational interest score results showing little degree of correspondence. This indicates that the construct of ability and that of vocational interest are not intertwined, but have low common variance. The exception to this pattern is the relationship between perceived ability and sub scale V. This sub scale could be characterized as relating to scientific pursuits requiring higher levels of education. Therefore females who perceived themselves as more academically able had higher scores on this variable than did those females who had lower ability self-perceptions.

- b. As a means of determining whether a single item with one selection from an ordered choice of six responses (dependent variable) would show a relationship to the inventoried results (independent variable) of the CCS, a chi-square analysis was performed. A matrix was developed and each respondent's pair of highest responses on the two variables was plotted and a chi-square com-

puted separately for males and females. For both males and females the resulting statistic was found to be significant beyond the .001 level of confidence. Although tentative and not fully tested, it seems possible that many secondary students are capable of choosing the cluster of work in which they are interested by simply responding to a choice of six statements, each of which describes a unique personal quality of individuals in Holland's typology.

- 
- c. Self-Questions 3 and 4 on the answer form given to students, provided an opportunity to develop a "personality scale" which could provide a comparison with each of the interest sub scales. Unfortunately the item was poorly conceived in that the respondents appeared to provide an "ethical" response to the questions rather than a "feeling" or "value" choice. An analysis of the results (observation only) indicated that the most socially desirable responses were given by a majority of the respondents. The skewing of the data therefore made analysis impossible and meaningless.

VI. Data Post-Study Analysis

Building upon the results of both the validation study and the normative study, certain obvious directions for post study data analysis were suggested. The results of these analyses were important to the revision of the Comparative Career Search before final dissemination and program implementation.

- a. The first analysis was suggested as a means of increasing the potential size of the raw score for each sub scale. Originally only the A responses were keyed to the sub scales and not the B responses (which were representative of occupations as well). Since relationship between each B score and A sub scale was available the data were re-analyzed so that norms, based on 24 (instead of 12) maximum responses for each sub scale, were produced. Appendix F provides a profile of the results of this analysis. The format for the answer form was adapted to these findings (Appendix G is the newly developed answer form).
- b. The second analysis to be conducted was in relation to concerns about the presentation of workers in the most race and sex equitable fashion. The following table presents the results of that analysis.

Table 11

Item Relationships to Sex, Race, and Holland
Typology as Portrayed in Worker Photographs

		Subscale (Holland Typology)						Total
Sex	Race	I	II	III	IV	V	VI	
Male	Caucasian	9	10	8	8	11	7	53
	Other	2	1	2	5	1	2	13
Female	Caucasian	11	11	5	8	8	7	50
	Other	2	0	5	1	3	1	12
Undistin- guishable	Caucasian	0	1	4	2	0	0	7
	Other	0	0	0	0	0	0	0
	Undistin- guishable	0	1	0	0	1	7	9
Total Item Count		24	24	24	24	24	24	144

As can be seen from Table 11 a balance has been achieved between male and female representatives in the pictures of workers within each of the test's six sub scales. In addition, the pictures provide a representation of other-than-Caucasian workers in proportion to their incidence in the general population.

- c. Through an analysis of the makeup of other interest inventories and a request from some test administrators in the normative sample it was determined advisable to provide a validity check within the test. This procedure would allow repeated opportunities for the test taker to respond to the same items. To accomplish this scoring procedure, six items were identified in the instrument as representing the bipolar opposites across Holland's typology. Two items thus represented each of the three bipolar opposite dimensions of the typology. The identical pictures were used again somewhere else in the instrument, but this time the choices were reversed. For example, the A pictures were shown in B and the B choice became the A choice. Scoring instructions have been developed whereby each test respondent may determine the consistency of responses made to the twelve items. Although no normative data are available regarding the responses a sense of consistency can be seen in an area provided on the front of the revised answer form. It is anticipated that further use with the instrument, CCS, will provide data upon which consistency profiles may be generated.

VII. Conclusions and Recommendations

Many of the findings from statistical analyses were in line with the

expected outcomes hypothesized in advance, but some fell short of anticipated results. It is evident from prior research that a non-reading formatted instrument can be developed, and that participants enjoy and gain self knowledge by their participation. It is also observable that student respondents have comparable profiles across all levels of demographic variables tested, except sex.

A filmstrip/cassette version of the original vocational interest test does have utility in producing vocational interest profiles for secondary youth.

The research results determined that item/sub scale correlations could be produced, and that this item analysis reduced the number of effective items from an original of 120 to the present 72.

Separate post analyses indicated that a relationship exists between the perceived ability of male students and their interest test results, while this same comparison does not hold true for females. Also indicated in the analysis was a finding that single sentence choices relating to the interest profile were chosen by respondents in a manner that correlated significantly with test-produced results. This may indicate that students could provide an indication of career cluster interest simply by responding to a series of six statements rather than by completing the Comparative Career Search.

Recommendations

1. Since the test instrument has been revised in significant ways following both the validity and normative studies, it would be recommended that samples of job incumbents and secondary youth

be tested to provide data for re-analysis and confirmation.

2. With the introduction of a validity check within the test, it would be important to determine the norms regarding this scale for test respondent comparison purposes. This should then form a portion of the instructions for scoring the test.
3. It would be recommended that the use of the Comparative Career Search be extended beyond Indiana's borders. This would require the advertisement and cost-return sale of the instrument to others for counseling or research use. Data from these results could then be compared with findings for Indiana students.

VIII. Supplemental and Appendix Materials

A. References

Cohen, J., Statistical Power Analysis for the Behavioral Sciences, Academic Press, New York, 1969.

Crowley, Thomas J., R. A. Gustafson, and L. Moore, Career Assessment Instruments for Secondary School Counselors, New Hampshire RCU, New Hampshire, 1976.

Cruise, Robert J., A Guide to Minimal Sample Selection, Dept. of Ed., Andrews U., Berrien Springs, Michigan, 1976.

Diamond, Esther E., "The Testing Controversy in Perspective: Implications for Counselors," SRA, Chicago, Illinois, Nov.-Dec., 1976.

Fleming, Malcolm L., Perceptual Principles for the Design of Instructional Materials, (Final Report of Project #9-E-001, Indiana University, Bloomington, Indiana,) January, 1970.

Freeberg, Norman E., "Assessment of Disadvantaged Adolescents: A Different Approach to Research and Evaluation Measures," Journal of Educational Psychology, 1970, Vol. 61, No. 3, 229-240.

Gottfredson, Linda S., and Vicky C. Brown, Holland Codes for the 1960 and 1970 Censuses: Detailed Occupational Titles, Center for the Social Organization of Schools, Johns Hopkins University, Baltimore, Maryland, 1977.

Gottfredson, Linda S., An Analytical Description of Employment According to Race, Sex, Prestige, and Holland Type of Work, Report No. 249, Center for Social Organization of Schools, Johns Hopkins University, Baltimore, Maryland, 1978.

Gottsfeld, Harry, Manual, Educational Values Assessment Questionnaire (EVA), Behavioral Publications, New York, 1973

Hanson, G. R., Assessing the Career Interests of College Youth: Summary of Research and Applications, ACT Research Report No. 67, American College Testing Program, Iowa City, 1974.

Holland, John L., Making Vocational Choices: A Theory of Careers, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1973.

Institute for Personality and Ability Testing, Handbook for the IPAT Humor Test of Personality, Forms A and B, Champaign, Illinois, 1966.

Khuory, Bernard V. (Program Director), 1977-78 Guide to the Use of the Graduate Record Examinations, Educational Testing Service, Princeton, New Jersey, 1977.

Lord, John, and C. B. Jewison, Handbook for the Production of 35mm Sound Filmstrips, 4th Edition, Dukane Corporation, St. Charles, Illinois, 1976.

McClelland, David, Toward a Theory of Motive Acquisition (occasional paper) Harvard University, Cambridge.

Noeth, Richard and Dale J. Prediger, "Career Development Over the High School Years," The Vocational Guidance Quarterly, Vol. 26, No. 8, March, 1973, P.244-254.

Norris, Lila, Martin R. Katz, and Warren Chapman, Sex Differences in the Career Decision-making Process, Educational Testing Service, Princeton, New Jersey, March, 1978.

Pears, Laura, and Amy Weber, Occupational Information in SIGI, A Handbook for Data Collection, Interpretation, Preparation, and Documentation, Educational Testing Service, Princeton, New Jersey, 1976.

Prediger, Dale, Harold Engen, and Rick Noeth, Exploring: You and Your Career, The American College Testing Program, Iowa City, 1973.

Prediger, Dale, and Gary Hanson, Evidence Related to Issues of Sex Bias in Interest Inventories, (Paper summarizing APA symposium presentations), American College Testing Program, Iowa City, 1976.

Prediger, D. J., J. D. Roth, and R. J. Noeth, Nationwide Study of Student Career Development: Summary of Results ACT Research Report No. 61, American College Testing Program, Iowa City, 1973.

Travers, Robert M. W., A Study of the Advantages and Disadvantages of Using Simplified Visual Presentations in Instructional Materials, USOE Grant, Dept. of HEW, Washington, D.C. June, 1969.

IX. Abstract

FINAL REPORT ABSTRACT

The Normative Study of Indiana Students Using the Comparative Career Search Test. Project No. 6-77-D-13, Indiana State Board of Vocational and Technical Education, Indianapolis

- A. The process/product(s) to be adapted and delivered by this project are:
50 copies of the Comparative Career Search, each including: a mailable container, 1 filmstrip in container, one cassette (audio), 200 answer forms, and directions. The products will be delivered to area vocational directors, in Indiana, who are present in a training session.
- B. Objectives
1. To complete an item analysis on the VISION test results to determine items for retention in CCS.
 2. To arrange the resulting instructional and interest items in a logical sequence for production of filmstrip and cassette forms of the test.
 3. To prepare a hand/machine scorable answer form compatible to the filmstrip and cassette.
 4. To develop normative tables involving a stratified random sample of Indiana secondary students.
- C. Procedures
1. Using biserial correlation statistics, compare item responses to sub scale total scores. Through a specific algorithm, select usable items.
 2. From the above results, and user comments, prepare revised 2 x 2 slides, locate filmstrip producers, and prepare both filmstrip and audio cassette of directions.
 3. From user comments, conversion of VISION answer sheets to machine/hand scorable forms will be done by a printer who is able to assure quality control. This product went to the lowest and best bidder.
 4. Stratified random sampling techniques assured a group of 50 school systems which used classroom sampling units for data production. The test was shown and the results returned to the Center for analysis across all levels of strata in the sample. Specific statistical analyses produced the necessary test of the Objectives and the development of student norms.
 5. Post-analysis of data produced recommendations for CCS revision for an ensuing year.
- D. Outcomes and Impacts
- The revised CCS will assist vocational counselors with the vocational interest patterns of their clients.

APPENDIX A

APPENDIX A

Names and Locations of Participants Agreeing to be Involved in the Normative Study

Linda Habegger	Fort Wayne	Secondary
LeRoy Nelson	Columbus	Middle
Oliver Wamer	Zionsville	Secondary
John Johnson	Zionsville	Middle
Newton Hatfield	Jeffersonville	Secondary
Glen Snelling	Lawrenceburg	Secondary
Velma Frame	Daleville	Secondary
Terry Hasler	Dubois	Secondary
Larry Lewis	Middlebury	Middle
Vernon Paler	Elkhart	Middle
Ruth Howard	Connersville	Secondary
Jim Griswold	Covington	Middle
Herb Hoffman	Gas City	Secondary
Wally Swayby	Bloomfield	Middle
Corlyss LeCount	Noblesville	Middle
Jerry Reinhardt	Lanesville	Middle
E. F. Schneider	Corydon	Middle
Richard Shew	Plainfield	Secondary
Shirley Smalley	New Castle	Secondary
Delbert King	Hanover	Secondary
Harry Pettibone	Franklin	Middle
Donald Mitchell	Trafalgar	Middle
Nancy Yeiter	Mentone	Secondary
Nick Julius	Gary	Middle
Mike Scianni	Hammond	Middle
William Cope	Hobart	Secondary
Harold Clindaniel	Union Mills	Secondary
Steve Timler	Pendleton	Secondary
Tom Garrison	Indianapolis	Secondary
Steve Macy	Crawfordsville	Secondary
Janet Ottenweller	Albion	Secondary
Gerald Johnson	Rising Sun	Middle
Wanda Williams	Orleans	Middle
William Weathers	Petersburg	Secondary
Paul Rommelman	Kouts	Secondary
Robert Mullen	Portage	Secondary
Melvin Levin	Mt. Vernon	Middle
Everett Gates	Union City	Secondary
Fred Menchinger	Osceola	Middle
Ronald Vaughn	Fremont	Middle
James Hartman	Sullivan	Secondary
Richard McQueen	Boonville	Secondary
Phil Acton	Wolcott	Secondary
Richard Sparks	Poneto	Middle
Carl Van Meter	Monticello	Middle
Dick Kline	Churubusco	Secondary

APPENDIX B

COMPARATIVE CAREER SEARCH

PRINT YOUR NAME IN THE BOXES PROVIDED. THEN, BLACKEN THE LETTER BOX BELOW WHICH MATCHES EACH LETTER OF YOUR NAME

MIDDLE INITIAL
FIRST INITIAL

YOUR LAST NAME

SELF QUESTIONS

Answer each question below with one response. Darken the one answer that is most like you.

1. If you did your best in school, where would you rank among your classmates?

- (A) At the top of the class
- (B) Above the average
- (C) Average
- (D) Somewhat below average

2. When thinking about work, would you rather do it—

- (A) in a neat, organized, well-planned manner?
- (B) where you tell others what to do?
- (C) through helping other persons?
- (D) by doing creative things?
- (E) among smart, scientific people?
- (F) outdoors?

3. When you're asked to do something, which do you consider?

- (A) What's in it for me and how long will it last?
- (B) What impression do others get of me for doing it?

4. Which do you most believe?

- (A) Making friends is a great goal to have.
- (B) Doing your best is more important than making friends.

COMPARATIVE CAREER SEARCH

A filmstrip projector, screen, cassette player, pencil, and this answer sheet are required to complete this survey.

DIRECTIONS: Fill in your name, sex, age, and four questions about yourself.

This is a survey to assist you in discovering those jobs that interest you most. The pictures and answer sheet are both numbered from one (1) through seventy-two (72). You are to mark only one answer for each picture. (signal)

The film shows people in different jobs. The drawings are clues to help you recognize the work being done. The pictures are of two persons performing different tasks. Select your preference of either upper or lower picture. (signal)

Mark your answer to show the work task you prefer, that is—mark either A or B. If you have no preference or feel indifferent about both pictures, mark the (?) space on the answer sheet. . . . (signal)

On the left side on the answer sheet is an EXAMPLE box. Mark in this example box your preferences for the next three pictures. You will have about ten (10) seconds to mark your choice for each picture. (signal)

Remember, if you prefer the kind of work pictured in A, blacken the response box below the letter A. (signal)

If you prefer the kind of work pictured in B, blacken the response box below the letter B. (signal)

If you prefer neither A nor B, or are uncertain, blacken the ? response box completely. (signal)

Do you have any questions? If you do, stop the sound until your questions are answered. If there are no questions, begin with the picture numbered one (1) and mark your responses through picture numbered seventy-two (72). (signal)

Use Pencil Only—Do Not Use A Pen Erase Any Mistakes Completely
Be Sure Each Mark Is Black And Completely Fills the Box

SIDE 1

EXAMPLE BOX

A	B	?

1	A B ?	13	A B ?	25	A B ?	37	A B ?	49	A B ?	61	A B ?	▶	☐	I
2	A B ?	14	A B ?	26	A B ?	38	A B ?	50	A B ?	62	A B ?	▶	☐	II
3	A B ?	15	A B ?	27	A B ?	39	A B ?	51	A B ?	63	A B ?	▶	☐	III
4	A B ?	16	A B ?	28	A B ?	40	A B ?	52	A B ?	64	A B ?	▶	☐	IV
5	A B ?	17	A B ?	29	A B ?	41	A B ?	53	A B ?	65	A B ?	▶	☐	V
6	A B ?	18	A B ?	30	A B ?	42	A B ?	54	A B ?	66	A B ?	▶	☐	VI
7	A B ?	19	A B ?	31	A B ?	43	A B ?	55	A B ?	67	A B ?	▶	☐	
8	A B ?	20	A B ?	32	A B ?	44	A B ?	56	A B ?	68	A B ?	▶	☐	
9	A B ?	21	A B ?	33	A B ?	45	A B ?	57	A B ?	69	A B ?	▶	☐	
10	A B ?	22	A B ?	34	A B ?	46	A B ?	58	A B ?	70	A B ?	▶	☐	
11	A B ?	23	A B ?	35	A B ?	47	A B ?	59	A B ?	71	A B ?	▶	☐	
12	A B ?	24	A B ?	36	A B ?	48	A B ?	60	A B ?	72	A B ?	▶	☐	

☐ ?

☐

☐

☐

☐

☐

☐

40

Scoring
(over) →

SIDE 2

☐ I

☐ II

☐ III

☐ IV

☐ V

☐ VI

DIRECTIONS:

You have just completed the COMPARATIVE CAREER SEARCH and should now be ready to determine your results. When this scoring process is completed, you will have seven (7) scores—six (6) will be row totals and one (1) will be your total number of (7) responses.

You should stop the sound while you complete each step, then re-start it for further instructions (signal).

Step #1: To determine the Roman Numeral I total score, count the number of A responses you darkened in the top two rows that begin with pictures numbered 1 and 2 and end with pictures numbered 61 and 62. Write that sum in the box with the arrow pointing toward it and the Roman Numeral I beside it. (signal)

Step #2: Continue, by counting the number of A responses you darkened in the remaining ten (10) rows. Write each 2-row total in the box that the arrow points to. (signal)

Step #3: To determine the total number of (7) responses, count each one you darkened down each column. Place those totals in the appropriate boxes at the bottom of the answer sheet. (signal)

Step #4: Add all of the (7) column totals together and write that sum in the ? box in the lower left corner of the answer sheet. (signal)

Step #5: Each of the Roman Numeral boxes you have just completed on Side 1 has a similar box on Side 2. Transfer the numbers from the Side 1 boxes to the appropriate blank boxes on Side 2. (signal)

Interpreting the Scores:

Look at the six scores you just recorded in the boxes on Side 2. Select the largest sum and read the words down that column. These occupations should be carefully considered by you. The persons who work at these jobs had scores similar to yours when they took this survey. If the largest sum was the same in more than one box, your interests may be similar to workers or students in those columns too. The field of study section suggests the type of schooling or training that is usually taken to enter the occupations listed above them.

One way of being more sure about work choices you prefer is to study the things people do who are in that field. You may wish to do this study through books or films, or it might be easier for you to visit people who are already in the occupation.

One caution, look at the number you wrote in the ? box on Side 1 of the answer sheet. If it is 35 or larger, you may want to take the survey again. A high ? score usually means you should not place a high value on your results on this survey.

OCCUPATIONS

Timekeeper Billie Key Punch Operator Tabulating Machine Operator Duplicating Machine Operator File Clerk Teller Mail Clerk Certified Public Accountant Time Study Analyst Accounting/Statistical Clerk High-Speed Printer Operator Office Worker Payroll Clerk Proofreader Typist Accounting Machine Operator Business (Commercial) Teacher Secretary Receptionist Telephone Operator Bookkeeper Cashier Data Processing Worker Accountant Clerk-Stenographer Travel Bureau Clerk	Banker Economist Real Estate Salesman Contractor Postmaster Sales Engineer Radio/TV Announcer Branch Manager Insurance Manager Manager, Restaurant/Bar Personnel Manager Production Manager Sales Manager Customer Service Manager Demonstrator Dispatcher, Motor Vehicle Sales Clerk Salesman Route Salesman Director of Guidance Systems Analyst Department Store Manager Life Insurance Salesman Encyclopedia Salesman Airline Stewardess Peddler	Employment Representative Funeral Director Rehabilitation Counselor Food Service Manager Claim Adjuster Educational Administrator Historian Counselor Home Economist Ticket Agent Athletic Coach Occupational Therapist Professional Nurse Social Worker Dietitian School Superintendent Politician YMCA Physical Director Physical Therapist Housewife Foreign Language Teacher Cosmetologist Clergyman Librarian Special Education Teacher Dental Hygienist	English Teacher Journalist-Reporter Drama Teacher Dancing Teacher Art Teacher Literature Teacher Music Teacher Musician Fashion Model Editor Designer Interior Decorator Artist Architect Photolithographer Sign Painter Photographer Furrier, Designer Drama Coach Entertainer (Dancer-Singer) Public Relations Man Foreign Language Teacher Wire Walker (Circus)	College Professor Physician Astronomer Production Planner Mathematics Teacher Medical-Laboratory Assistant Repairman-TV Optometrist Psychiatrist Bacteriologist Pharmacist Computer Programmer Tool Designer Equipment Repairman Research Assistant Chemist Botanist Oceanographer Veterinarian Dentist Electrical Engineer Airplane Pilot Instrument Repairman Laboratory Technician Military Officer Tool Maker	Architectural Draftsman Dental Technician Forester Electrician Tool and Die Maker Baker Optician Mechanical Engineer Civil Engineer Aircraft Mechanic Lineman (tel. & tel.) Sheet Metal Man Heavy Equipment Operator Upholsterer Carpenter Farmer Barber Waitress Vocational Agriculture Teacher Policewoman or Policeman Railroad Engineer Bricklayer Truck Driver Cement Mason Mail Carrier Bus Driver
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FIELDS OF STUDY

Business and Commerce, general Accounting Business Statistics Banking and Finance Business Management and Administration Secretarial Studies (baccalaureate and higher programs) Personnel Management Labor and Industrial Relations Computer and Information Science Data Processing Computer Programming Key Punch Operator Records Management Receptionist/Typist Stenographic Program Court Reporter Program Library Assistant Technologies Printing Technology Duplicating Machine Operation Sewing Machine Operation	Business and Commerce Banking and Finance Investment and Securities Real Estate Technology Business Economics Radio/Television Technology Marketing Technology Purchasing Technology Personal Service Technologies (Stewardess, etc.) Sales Technology Advertising Technologies Cashier Technologies Display Manager Law Building and Related Technologies Government Labor Relations Technology Personnel Management Insurance Technology Retail Merchandising Travel and Recreational Technologies Sales Clerk Training	Nursing (baccalaureate) Occupational Therapy Physical Therapy Podiatry Speech Pathology and Audiology Social Work and Helping Services Parks and Recreation Management Urban Studies Social Sciences (general) History Political Science and Government Sociology Dental Assistant Technologies Dental Hygiene Technologies Nursing, Practical Surgical Technologies Optical Technologies Public Service Technologies Bible Study or religious related occupations Funeral Science Technologies Beauty Culturist Manicurist Professional Dog Groomer Teacher Wig Stylist	Architecture Interior Design Technology Journalism Radio/Television Art Music Dramatic Arts Dance Cinematography Photography Architectural Design Technology Commercial Art Technology Manufacturing Design Technology Art History and Appreciation Applied Design Speech Debate Stage Direction Music History and Appreciation Clothing, Textiles Piano Technician Training Religious Education Radio or TV Director Training	Medical Technology Radiologic Technology Dental Hygiene Chemistry Mathematics Plant Pathologist Inorganic Chemistry Maintenance Electrician Animal Science Technology Cytotechnology Medical Assistant Operating Room Technician Radiologic Technologist Commercial Pilot Training Optometry Zoology Medicine Astronomy History Marine Biology Aerospace Engineering APPRENTICESHIP PROGRAMS Electrician Industrial Electrician	Agriculture Forestry Mechanical Engineering Typewriter Repair Heavy Equipment Operation Agronomy Tailoring Power House Engineer Truck Driving Police Academy Fire Academy APPRENTICESHIP PROGRAMS Bricklayer Carpenter Cement Mason Gleazier Ironworker Structural Steel Worker Lather Machinist Millwright Operating Engineer Painter Pattern Maker Pipefitter Plasterer Plumber Roofers Sheet Metal Worker
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APPENDIX C



INDIANA CAREER RESOURCE CENTER

1201-09 S. Greenlawn • South Bend, IN 46615 • 219/289-2851

Superintendent:

The Indiana Career Resource Center has been validating a career interest test that requires no reading and is useful at the junior high through adult levels of education. The format of the test is a filmstrip with the directions recorded on a cassette tape. The total time any classroom requires is 45 minutes. The answer sheets are both machine and hand scorable so career interests of students may be determined at the time of testing, by each participating youth. With at least five years of preparatory development, the project is in its final stages and should be available for use by your faculty at the end of this project year.

Funded by the State Board of Vocational and Technical Education, last year's validation project provided impressive results with workers in their chosen field. An abstract of those results is attached.

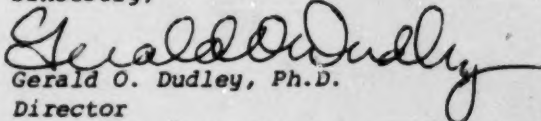
The project continues this year and seeks to develop norm tables for students at all school levels from the seventh through twelfth grades. With the knowledge that these test results correctly indicate the field of work of employed persons; and with the availability of norm tables of typical responses of adolescents, a student's career search may be enlightened.

The next stage in the development of the instrument necessitates the gathering of test responses from a sample of students in grades 7 through 12. That sampling will be accomplished during January and February 1978. When this random sample is chosen (during November), fifty sites will be selected and each site will be asked to gather data within six classrooms - two each at three secondary grade levels. A letter will be sent to the selected superintendents soliciting cooperation. This letter will request the name of a contact person in the school system to receive correspondence, etc.

If your school corporation is one of fifty randomly selected from among the over three hundred in Indiana, I would hope that you would provide the name of a contact person and support that person's participation in the project. Career searching has become an important process with our school age youth, and interest measurement and interpretation has been shown to enhance that process.

Should you have any questions that are unanswered, please feel free to write or call.

Sincerely,


Gerald O. Dudley, Ph.D.
Director

GD:db

Enc.

ABSTRACT

Project Title - The Development and Validation of a Vocational Interest Survey Instrument with Audiovisual Format

Project No. - 37-75-C

Sponsor - Indiana State Board of Vocational and Technical Education, Indianapolis, Indiana.

Project Dates - July 1, 1975 - June 30, 1976 (Extended)
Report (Final) Date - December 1976

Principal Investigator - Gerald O. Dudley, Ph.D., Indiana Career Resource Center, 1209 S. Greenlawn Avenue, South Bend, Indiana 46615.

Fiscal Agency - Penn-Harris-Madison School Corporation, Osceola, IN 46561.

Funding Level - \$9,550.00

The choice of careers is thought to be aided by the use of properly interpreted interest test results. Presently available instruments are limited because of: reading requirements, non-motivational, scoring delays, adult monitoring, and improper validation. This project sought to nullify those limitations through the development and validation of a 2 x 2 slide format survey instrument that requires picture choice for completion. The results of using the instrument, once developed, with samples of workers, high school vocational students, and post high school vocational students were analyzed in the study.

The theoretical groups from which items (pictures) were developed and the order in which test results were displayed are similar to those proposed by John Holland in his description of vocational personalities. Null hypotheses were stated to test important aspects of the instrument validity. Through correlational analysis, the following results were evident:

1. V.I.S.I.O.N. (the name of the developed instrument) contains over 200 pictures judged to represent work being performed by specific job incumbents. Perfect rater reliability qualified the pictures for inclusion in the test.
2. The survey instrument shows a high degree of correspondence (average scale $r = .615$) with the Vocational Preference Inventory, indicating they both may be measuring the same constructs of vocational behavior.
3. The ability of the instrument to detect the Holland cluster in which the job incumbent functions is quite high (average $r = .398$).
4. V.I.S.I.O.N. does not appear to be sensitive enough to detect the specific job title in which the job incumbent functions.
5. The instrument does not appear to show any relationship between the V.I.S.I.O.N. test sub scale results and the vocational training program in which student samples were enrolled. The relationship between measured interests and vocational courses appears to be quite low among both high school and post high school students.

Recommendations for further action are as follows:

1. Item analyze the results of the study to determine critical items, or response levels, and delete or improve those items not making contributions to total scores.
2. Develop filmstrip test formats and machine/hand scorable answer forms for ease of use.
3. Develop student normative data from use of the revised instrument with middle school, high school, and post high school subjects to provide a focal point for norm-reference interpretation.



INDIANA CAREER RESOURCE CENTER

1201-09 S. Greenlawn • South Bend, IN 46615 • 219/289-2851

November, 1977

Superintendent:

During this month I mailed you a letter announcing the development of a career interest test for use with seventh through twelfth grade students. During this mailing process, an abstract of the already-completed validation study did not get inserted in your envelope. A copy of that errant abstract is enclosed for your reading.

This letter is an offer for your school system to participate in the development of student norms for the survey (now named Comparative Career Search). Once these norms are prepared, the survey and norm tables will be made available for use in career development and career guidance programs in Indiana schools.

Your corporation was one of fifty randomly selected from the 291 school systems in Indiana. If you choose to participate, you (or your representative) will be given further details regarding the norming process. Your school corporation would receive enough answer sheets to test six classrooms of ~~7, 8, 9, 10, 11, 12~~ grade students (two pre-selected classrooms at each grade level). The details would be worked out so that the 45-minute survey could be completed in the randomly selected classrooms during January and/or February, 1978. Each participating student would be able to determine his career interest results at the time of testing, with all answer sheets being returned to this Center for machine scoring.

The test results for each student will lose student identity and become a portion of the total normative sample. Each school system will, however, receive a print-out of results listed for each student. These may be used as a counseling tool.

To assist us in the planning process, we would appreciate having you return the enclosed card which indicates your (or your representative's) knowledge of and willingness to participate in this project. Should you have unanswered questions, I may be reached at 219/289-2851.

I would appreciate receiving your reply by December 1, if possible, so that written details can follow to the person you designate in your corporation.

Sincerely,

Gerald O. Dudley, Ph.D.

sm

Enclosure

A Total Community Approach to Career Education

Second Select Mailing
Comparative Career Search Norming

School Code _____

We are willing to participate.

Yes No
(circle)

Future correspondence should be directed to:

(Name)

(Title)

(Address)

(Phone)

Please return by December 1, 1977.



INDIANA CAREER RESOURCE CENTER

1201-09 S. Greenlawn • South Bend, IN 46615 • 219/289-2851

December 1977

Dear Colleague:

I have received a postcard from your superintendent indicating the willingness of your school system to participate in a test norming process. The card listed your name and address for subsequent communications.

The vocational interest test being normed through this project has already been validated with a working adult sample. For your information, an abstract of those findings is enclosed.

For student sampling, your corporation and forty-seven others have been randomly chosen from the 291 school systems in Indiana. Each corporation will in turn randomly choose two classrooms of students at each of three grade levels (7, 8, 9 or 10, 11, 12) for test administration.

To insure randomness in the six classes you choose, the following procedure is suggested:

1. Alphabetically list the last names of the teachers in your school(s) and assign a number to each name, in sequential order, starting with 1. If your teacher population is large, you may find it easier to create a separate list for each of the three grade levels shown above.
2. In random fashion, choose a class period from the school day. This period will be the one during which the testing should be scheduled.
3. Again, in a random manner, select a teacher name (by choosing assigned numbers) and note the class that teacher has during the period determined in 2 (above).
4. Continue to select teachers in the manner shown in 3 (above) until you have isolated two classes at each of the grade levels assigned. Realizing that teachers overlap grade levels and that grade levels overlap classes, it will probably be difficult to select classes where students are all at the same grade level. Perhaps you can select at least those classes where a majority will be from a single grade.

December 1977

5. If a class is selected in which a majority of the students are quite different from students found in the balance of the school system, don't use it, but replace it by yet another random selection.
6. These then are the six classrooms I would like for you to use when the testing material is mailed to you in late January or early February 1978. It might be important for you to make early contact with those teachers regarding their participation.
7. On the enclosed card I would appreciate having you write the total number of students in the six classes. Upon return of that card, an appropriate number of answer sheets can be packaged for your use. If your best address for receiving materials is different from the one on the card, please make corrections.

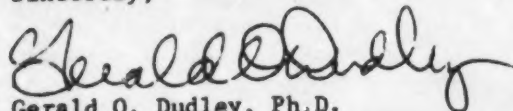
As further information to you, the vocational interest test (now named Comparative Career Search) requires no reading since it is in filmstrip/cassette format. It is possible to complete the survey in 45 minutes. This would include both the taking and student self-scoring of the answers. The answer sheet includes interpretation information so that students might immediately relate their results to potential occupational areas of interest.

When all testing is completed in the six classrooms, each student's answer sheet will be collected and returned to this Center for machine scoring. These forms and the testing material will be picked up at your school by United Parcel Service on a date we can agree to later.

Upon return, the scoring process will generate student normative data as well as a list of results that will be sent back to you for your use with each student tested.

Should you have any questions that are unanswered, please feel free to write or call.

Sincerely,



Gerald O. Dudley, Ph.D.
Director

GD:db

Enc.

Comparative Career Search Norming

School Code _____

~~We are willing to participate.~~ Yes No
~~(circle)~~

No. of Students _____

Future correspondence should be directed to:

(Name)

(Title)

(Address)

(Phone)

Please return by December³¹, 1977.



INDIANA CAREER RESOURCE CENTER

1201-09 S. Greenlawn • South Bend, IN 46615 • 219/289-2851

January 1978

Dear Cooperating Educator:

On behalf of the Indiana Career Resource Center and the State Board of Vocational and Technical Education, I want to express an appreciation for your efforts in gathering normative data for the Comparative Career Search test. Without such assistance it would be impossible to develop promising interest measures of a valid nature.

You will find in this package all that is needed to administer the interest survey, gather the results, and package the materials for their return trip to this Center:

- a. Enough answer sheets are included to meet the demands you indicated by postcard at an earlier date. The stamped number on each answer sheet simply identifies your school corporation for sorting at a later date. If, for some policy reason, your school does not want students to fill in the name grid, that is O.K. It is necessary, however, that age, grade, and sex information be completed during the testing process (approximately 45 minutes).
- b. I would encourage you to self-complete the test prior to your administering it.
- c. When the class has completed the test and arrived at their scores, you might encourage them to record their results on separate paper since these answer forms are to be returned. Check to see that all blanks are filled properly on each answer sheet.
- c. The attached postcard is for you to return indicating the exact date you will have the completed test materials packaged for return. United Parcel Service will be instructed to pick up the completed test materials (exactly as they were packaged when you received them - same box, same weight, no rattles). It will be necessary to have the material picked up at the same location they were delivered. The return label should be glued on top of the label that brought the package to you.

If you should have further questions, please call 219/289-2851.

Sincerely,

Gerald O. Dudley
Gerald O. Dudley
Director

GD:db

51

A Total Community Approach to Career Education

Encs.

Comparative Career Search Forming

School Code _____

Pickup Date _____

Future correspondence should be directed to:

(Name)

(Title)

(Address)

(Phone)

APPENDIX D

COMPARATIVE CAREER SEARCH

A filmstrip projector, screen, cassette player, pencil, and this answer sheet are required to complete this survey.

DIRECTIONS: Fill in your name, sex, age, and four questions about yourself.

This is a survey to assist you in discovering those jobs that interest you most. The pictures and answer sheet are both numbered from one (1) through seventy-two (72). You are to mark only one answer for each picture. (signal)

The film shows people in different jobs. The drawings are clues to help you recognize the work being done. The pictures are of two persons performing different tasks. Select your preference of either upper or lower picture. (signal)

Mark your answer to show the work task you prefer, that is—mark either A or B. If you have no preference or feel indifferent about both pictures, mark the (?) space on the answer sheet. . . . (signal)

On the left side on the answer sheet is an **EXAMPLE** box. Mark in this example box your preferences for the next three pictures. You will have about ten (10) seconds to mark your choice for each picture. (signal)

Remember, if you prefer the kind of work pictured in A, blacken the response box below the letter A. (signal)

If you prefer the kind of work pictured in B, blacken the response box below the letter B. . . . (signal)

If you prefer neither A nor B, or are uncertain, blacken the ? response box completely. (signal) (signal)

Do you have any questions? If you do, stop the sound until your questions are answered. If there are no questions, begin with the picture numbered one (1) and mark your responses through picture numbered seventy-two (72). (signal)

DIRECTIONS:

You have just completed the **COMPARATIVE CAREER SEARCH** and should now be ready to determine your results. When this scoring process is completed, you will have seven (7) scores—six (6) will be row totals and one (1) will be your total number of (7) responses.

You should stop the sound while you complete each step, then re-start it for further instructions (signal).

Step #1: To determine the Roman Numeral I total score, count the number of A responses you darkened in the top two rows that begin with pictures numbered 1 and 2 and end with pictures numbered 61 and 62. Write that sum in the box with the arrow pointing toward it and the Roman Numeral I beside it. (signal)

Step #2: Continue, by counting the number of A responses you darkened in the remaining ten (10) rows. Write each 2-row total in the box that the arrow points to. (signal)

Step #3: To determine the total number of (7) responses, count each one you darkened down each column. Place those totals in the appropriate boxes at the bottom of the answer sheet. (signal)

Step #4: Add all of the (7) column totals together and write that sum in the ? box in the lower right corner of the answer sheet. (signal)

Step #5: Each of the Roman Numeral boxes you have just completed on Side 1 has a similar box on Side 2. Transfer the numbers from the Side 1 boxes to the appropriate blank boxes on Side 2. (signal)

Interpreting the Scores:

Look at the six scores you just recorded in the boxes on Side 2. Select the largest sum and read the words down that column. These occupations should be carefully considered by you. The persons who work at these jobs had scores similar to yours when they took this survey. If the largest sum was the same in more than one box, your interests may be similar to workers or students in those columns too. The field of study section suggests the type of schooling or training that is usually taken to enter the occupations listed above them.

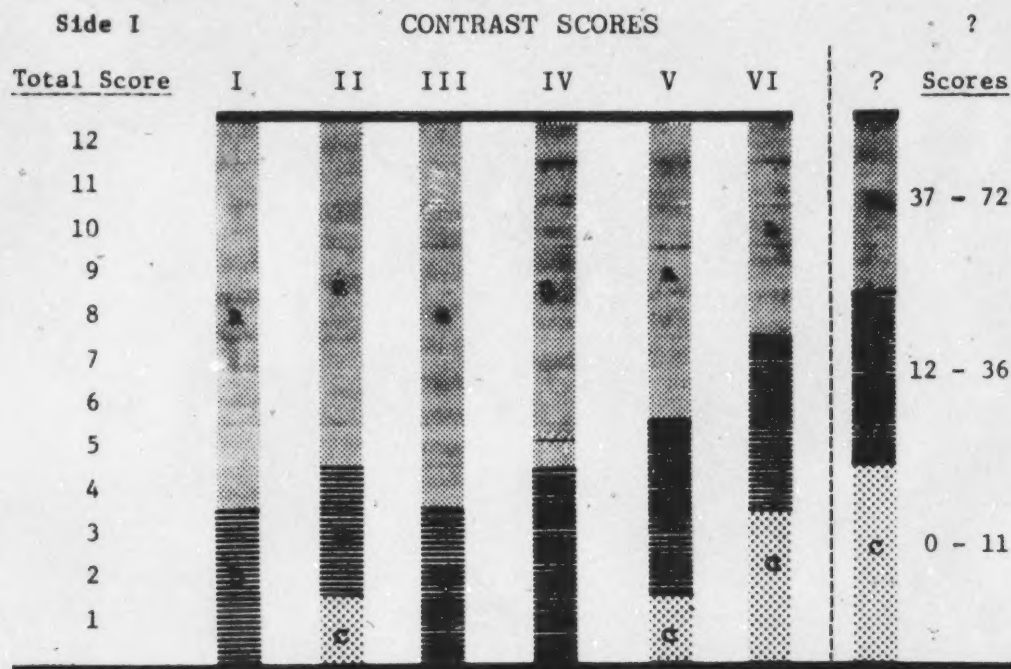
One way of being more sure about work choices you prefer is to study the things people do who are in that field. You may wish to do this study through books or films, or it might be easier for you to visit people who are already in the occupation.

One caution, look at the number you wrote in the ? box on Side 1 of the answer sheet. If it is 35 or larger, you may want to take the survey again. A high ? score usually means you should not place a high value on your results on this survey.

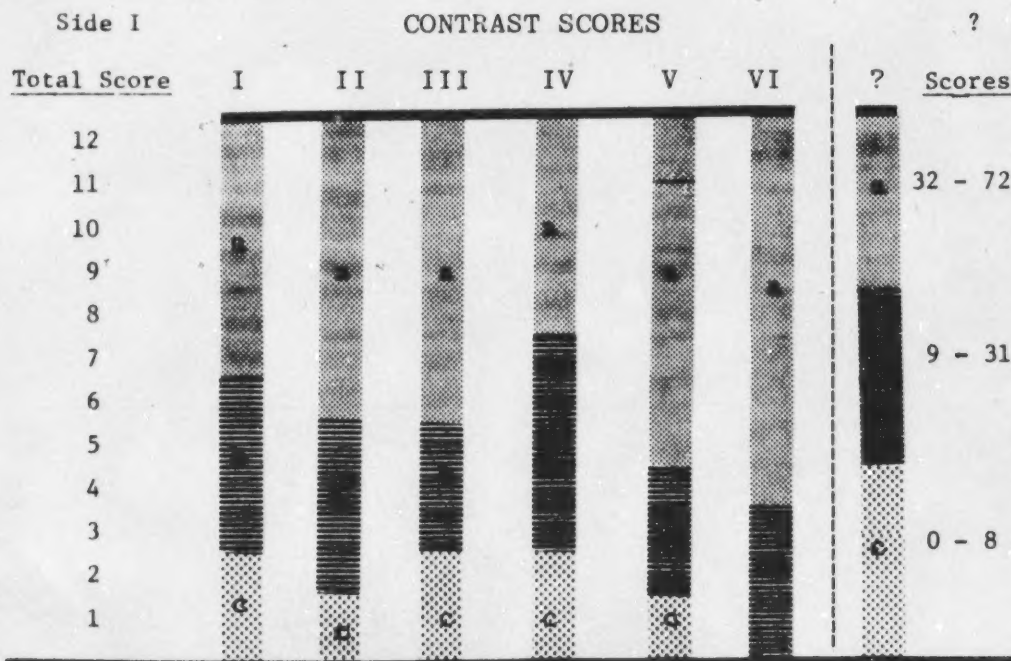
APPENDIX E

COMPARATIVE CAREER SEARCH
Normative Tables
For Male and Female Students, Ages 12-18

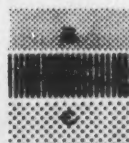
Male, N = 2908



Female, N = 2505



Contrast interpretation:



= higher than usual interest

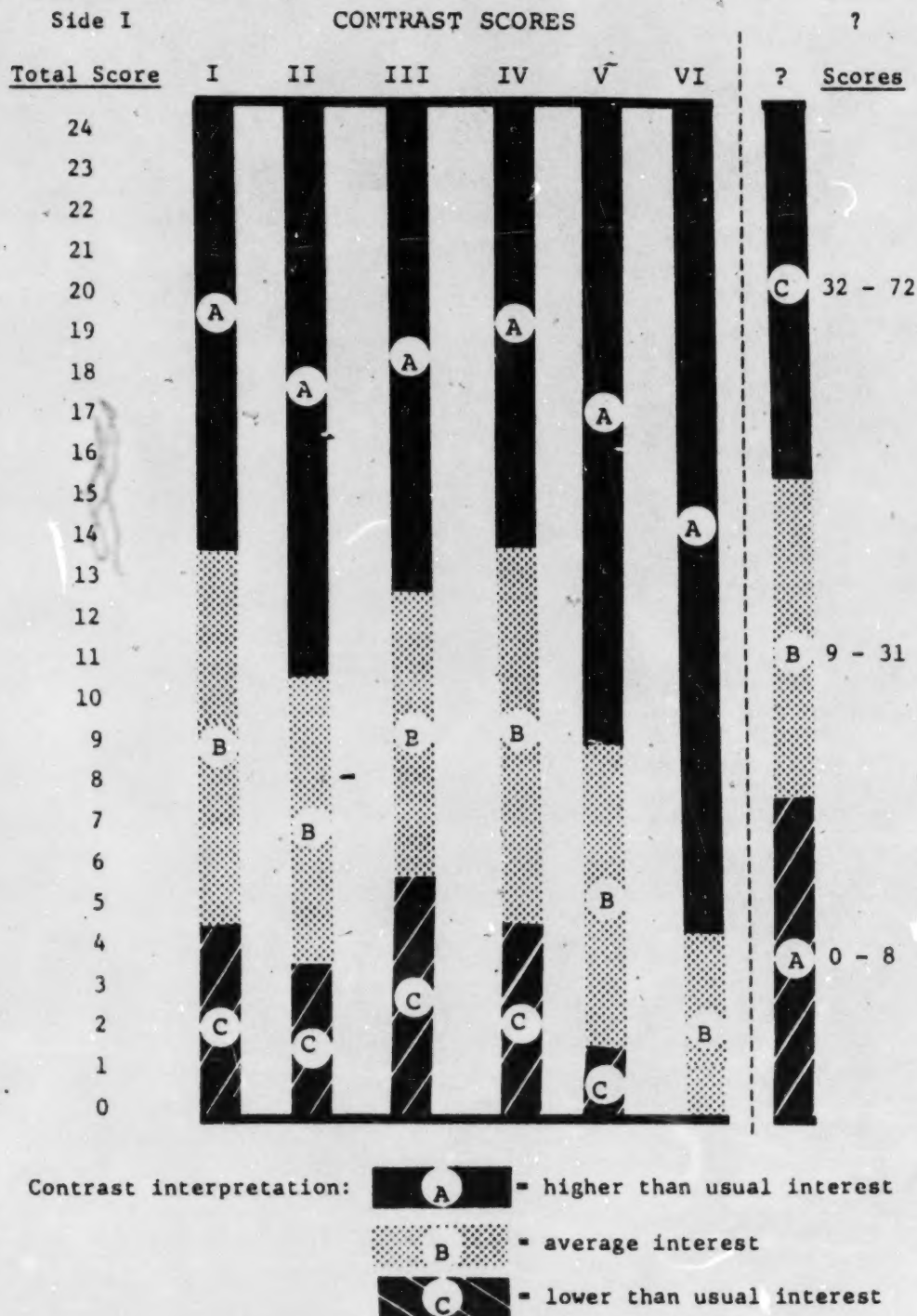
= average interest

= lower than usual interest

APPENDIX F

COMPARATIVE CAREER SEARCH
Normative Tables
For Female Students, Ages 12-18

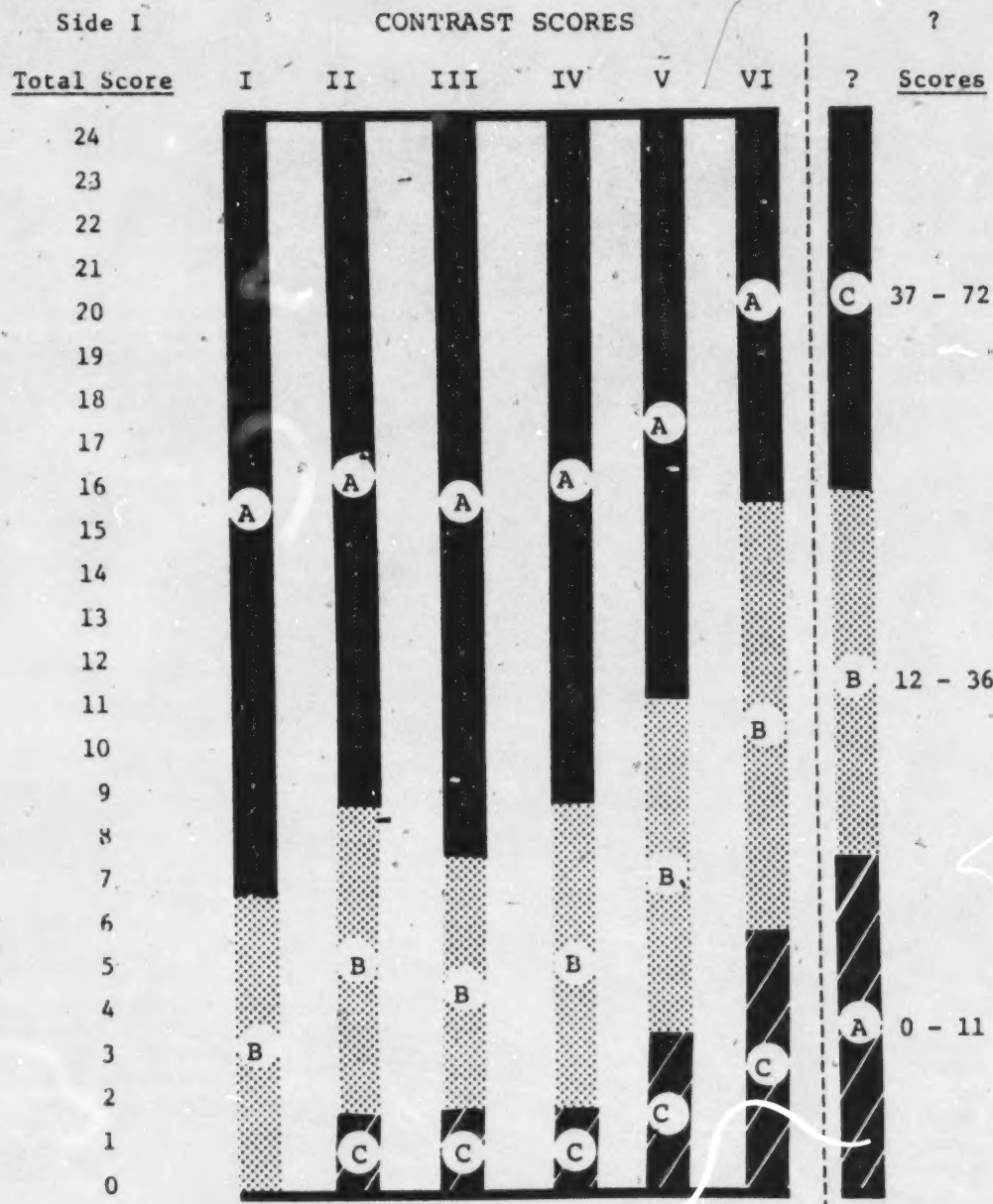
Female, N = 2505



Compiled by: Indiana Career Resource Center, South Bend, January, 1979.

COMPARATIVE CAREER SEARCH
Normative Tables
For Male Students, Ages 12-18

Male, N = 2908



APPENDIX G

NAME _____ DATE _____

SEX _____ GRADE _____ AGE _____ COUNTY _____

SCHOOL _____

COMPARATIVE CAREER SEARCH

**A FILMSTRIP PROJECTOR, SCREEN, CASSETTE
PLAYER, PENCIL, AND THIS ANSWER SHEET
ARE REQUIRED TO COMPLETE THIS SURVEY.**

DIRECTIONS: Fill in your name, date, sex, grade, age, county, and school.

(signal) This is a survey to assist you in discovering those jobs that interest you most. Your answer sheet has seventy-two (72) spaces for you to mark (signal)

The film shows people at work. Two photographs are of persons doing *different* jobs. The drawings beside them are clues to the tasks they are performing (signal)

During the survey, you will be asked to select your preference for the upper drawing and photograph—labeled A, or the lower pair—labeled B (signal)

You will then mark your answer to show the choice of work *you* prefer—that is, *either* A or B. If you *cannot decide*, blacken in the (?) response space . . .

The pictures show people at work. Your choice—A or B—should *not* be influenced by the sex of the persons in the pictures, but by the work they are doing (signal)

On the left side of the answer sheet is an example box. In a few moments, you will be using this box to mark your preference for three sample pictures (signal)

Remember, if you prefer the kind of work pictured in A, blacken the response space below the letter A. If you prefer the kind of work pictured in B, blacken the B response space. If you cannot decide, you may blacken the (?) space. Mark *only one* response for each picture. You will have about 10 seconds to mark your choice for *each* of the next three pictures (signal)

Do you have any questions? If you do, stop the sound until your questions are answered If there are no questions, begin marking your responses to the next 72 pictures. Make certain the number shown in the picture is the same as the response number you are marking on your answer sheet (signal)

Begin

EXAMPLE BOX

	A	B	?
X	☐	☐	☐
	A	B	?
Y	☐	☐	☐
	A	B	?
Z	☐	☐	☐

[illegible]

4		46
6		36
8		38
15		57
17		47
19		49

Use Pencil Only—Do Not Use A Pen

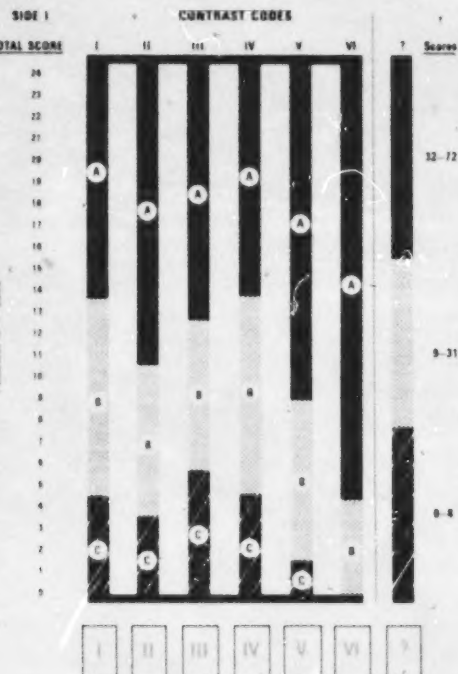
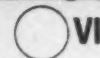
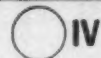
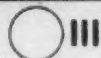
Erase Any Mistakes Completely

Be Sure Each Mark Is Black And Completely Fills The Box

SIDE 1

	A	B	?		A	B	?		A	B	?		A	B	?		A	B	?		A	B	?		A + B = TOTAL
I	1	A	B	?	13	A	B	?	25	A	B	?	37	A	B	?	49	A	B	?	61	A	B	?	▶ □ + □ = □ I
II	2	A	B	?	14	A	B	?	26	A	B	?	38	A	B	?	50	A	B	?	62	A	B	?	▶ □ + □ = □ II
III	3	A	B	?	15	A	B	?	27	A	B	?	39	A	B	?	51	A	B	?	63	A	B	?	▶ □ + □ = □ III
IV	4	A	B	?	16	A	B	?	28	A	B	?	40	A	B	?	52	A	B	?	64	A	B	?	▶ □ + □ = □ IV
V	5	A	B	?	17	A	B	?	29	A	B	?	41	A	B	?	53	A	B	?	65	A	B	?	▶ □ + □ = □ V
VI	6	A	B	?	18	A	B	?	30	A	B	?	42	A	B	?	54	A	B	?	66	A	B	?	▶ □ + □ = □ VI
	7	A	B	?	19	A	B	?	31	A	B	?	43	A	B	?	55	A	B	?	67	A	B	?	▶ □ + □ = □ VII
	8	A	B	?	20	A	B	?	32	A	B	?	44	A	B	?	56	A	B	?	68	A	B	?	▶ □ + □ = □ VIII
	9	A	B	?	21	A	B	?	33	A	B	?	45	A	B	?	57	A	B	?	69	A	B	?	▶ □ + □ = □ IX
	10	A	B	?	22	A	B	?	34	A	B	?	46	A	B	?	58	A	B	?	70	A	B	?	▶ □ + □ = □ X
	11	A	B	?	23	A	B	?	35	A	B	?	47	A	B	?	59	A	B	?	71	A	B	?	▶ □ + □ = □ XI
	12	A	B	?	24	A	B	?	36	A	B	?	48	A	B	?	60	A	B	?	72	A	B	?	▶ □ + □ = □ XII

SIDE 2



APPENDIX H

User's Manual

COMPARATIVE CAREER SEARCH

Developed by

Indiana Career Resource Center
1209 South Greenlawn Avenue
South Bend, Indiana 46615

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and Technical Education, All Rights Reserved

This vocational interest test was developed, validated, and normed by the Indiana Career Resource Center through Projects No. 37-75-C and 6-77-D-13 of the State Board of Vocational and Technical Education, 401 Illinois Building, 17 West Market Street, Indianapolis, Indiana, 46204. The fiscal agent for the funds was the Penn-Harris-Madison School Corporation, Osceola, Indiana 46541.

The State Board of Vocational and Technical Education and the Penn-Harris-Madison School Corporation comply with all federal regulations prohibiting discrimination on the basis of race, religion, national origin, sex, age, handicap, or veterans' status in matters pertaining to admissions, employment and access to programs.

Comparative Career Search - User's Manual

DESCRIPTION AND PURPOSE

The Comparative Career Search (CCS) is an objective, forced-choice format, self-administered measure of vocational interests. It is appropriately used with adolescent and adult males and females. The test contains 72 items in the form of filmstrip frames. Each frame contains two photographs and two (associated) line drawings simulating persons in their performance of contrasting work tasks. The function each photograph depicts is considered "typical" of job incumbents in that occupation. The line drawings beside each color photograph assist with discerning the work represented in the photo.

The inventory yields seven scores, six of which relate to vocational preferences, with the seventh serving as a cut-off score for purposes of test result usability. The six areas of vocational preference correspond to the unique groups of occupations (and major study areas) described by Holland (1973) as characteristic of the social or physical environments found through American work opportunities.

Vocational interest measurement is seen as one method of describing and explaining certain

behaviors of individuals considered important in career planning. With career choice considered a life-long series of events, the necessity for realistic information becomes important to the individual. The rationale for using interest measures with youth and adults is to provide an efficient means of summarizing work exploration potentials.

Specifically, it allows individuals to vicariously perceive a large variety of work settings and focus on those options which seem most personally appealing and appropriate. It also provides a means for developing an organized description of information about themselves so that self awareness, self understanding, and self enhancement might be scientifically structured.

This User's Manual is provided to assist the CCS test user in several ways. The first way is through detailed instructions to simplify the task of test administration. The second way is through the provision of rationale and meaning to support the interpretation of the results. The third way is through providing sufficient research data and descriptive information so that potential test users can make decisions about the appropriateness of CCS to their needs.

COMPARATIVE CAREER SEARCH ADMINISTRATION

Time - The approximate elapsed time for administering, scoring, and interpreting the survey is 35 to 45 minutes. Additional time should be planned to relate the results through career exploration and activities. This may be accomplished either individually or in groups.

Equipment - The equipment necessary for administering the CCS includes the following items:

- a. CCS filmstrip (slides also available) of 112 frames.
- b. Audio-cassette of instructions and test-taking music with audible and silent pacing signals.
- c. CCS answer sheet in hand/machine scorable format for each individual.
- d. Filmstrip projector, screen, cassette player, and soft lead pencils.

Test Taking environment - The facility should be darkened enough to be able to view the projected filmstrip, but also light enough for each respondent to see the answer form. Some lights may be on if they do not interfere with the viewing screen. A totally dark room is not appropriate for taking the survey.

SCORE INTERPRETATION

The meaning of the results follows the general vocational interest areas proposed by Holland (1958, 1964, 1966, 1973). In using the psychometric construct of interests, Holland views occupational choice as a congruence between an individual's personal preferences and the opportunities for satisfaction afforded by work environments.

Theoretically, the individual is predisposed vocationally to one of six work environments; realistic, investigative, artistic, social, enterprising, and conventional. Two instruments measure aspects of this theory. The Vocational Preference Inventory (1965) has been the mainstay in this research. The Self-Directed Search (1972) is a self administered, self-scored, self-interpreted paper-and-pencil measure with scores which provide the test-taker with a position in Holland's typology of persons and environments related to careers. Gottfredson (1978) provides the following information about employment within each of the six work types:

Actual Employment in Different Types of Work
in 1970 and Projected Employment in 1980

(Percent)

Type of Work	Census 1970	Manpower Projections 1970	1980
Realistic	47.7	49.9	47.5
Investigative	4.2	3.4	4.1
Artistic	1.4	1.4	1.4
Social	12.2	8.2	9.0
Enterprising	17.0	18.4	18.1
Conventional	17.4	18.6	19.9

It is against this backdrop that the scores on the Comparative Career Search are given meaning. Test takers have responded to items depicting work environments. The number of items they selected from representative pictures in each work cluster are noted and compared with normative results from a study of age 12 through young adult respondents. The areas in which the respondents scores compare most favorably are the ones of greatest vocational interest and thus should be the areas to pursue further through career exploration activities. This normative study revealed that separate norms are necessary for male and female respondents.

In general, the person-descriptions that follow connote generalizable comments about each of the interest areas on the Comparative Career Search.

I - A liking for ordered activities; comfortable in large organizations; a preference for knowing what is expected; self-controlled; material possessions and status are valued; less interested in engaging in physical pursuits or intense relationships.

II - Comfortable in verbal use of words; energetic, enthusiastic, adventurous, self-confident, dominant; leadership prone; persuasive; impatient with detail or precision; values power, status, material wealth.

III - Concerned with other's welfare; sociable, responsible, responsive, humanistic; able to express feelings and get along with others; comfortable in groups; problem solvers using discussion; less interested in physical exertion or using machinery.

IV - Enjoys self-expression opportunities; able to work alone; sensitive, emotional, non-assertive, original; less interest in structure or order; unconventional; abstract.

V - Likes scientific pursuits and investigation; task oriented; needs to understand functions of physical properties; thinks rather than acts; original, creative; less people oriented; problem solver of ambiguous challenges; mathematical.

VI - Prefers physical skills; aggressive, rugged, robust, practical, strong; outdoor oriented, chooses tools and power machines; conservative in political and economic opinions; physical and creative with the hands; non-person oriented.

In addition to providing a number of occupations to consider in each of the six areas of test results, areas in which study and schooling might be pursued are also listed.

STATISTICAL INFORMATION

Validity

The data reported in this section were obtained through a validation study of Comparative Career Search (formerly VISION) in 1976. The study utilized a sample of 202 male and female workers in Northern Indiana and Southern Michigan. The sample was stratified along dimensions representative of the working population and within the six occupational clusters previously described. Sample makeup was as follows:

<u>Work Type</u>	<u>Proportional Distribution</u>
VI	34%
V	15
IV	7
III	19
II	15
I	10

73¹

The form of the test used in this study contained 120 choices. The present form resulted from item analysis of that data and reduced the number (of items) to 72.

a. Content Validity

The pictures included in each of the test items of the instrument were selected through expert judgment by three independent raters. The photographs were used if all three raters matched the photograph correctly with a specific job title meant to be represented by the picture. The pictures were filmed through poses of individuals performing "typical" job tasks characteristic of the Dictionary of Occupational Titles description of the job.

b. Concurrent Validity

The sample of 202 workers was administered the test concurrently with the Vocational Preference Inventory. The VPI was developed and validated as a measure of vocational personalities. The outcomes show that personality variables may be usefully interpreted as vocational interest traits. Recent research with the VPI indicates that the vocational choice of individuals can be categorized according to the six types of scales (personality) resulting from the test (Holland, 1973). To the extent that the VPI and the CCS produce correlational simi-

larities for a broad variety of workers, it may be expected that they are measuring the same psychometric construct.

The Table below reports the intercorrelations between similar scales (personality or interest variables) on the two measures.

Intercorrelations Among the Scores
for 202 Workers Respondents to
CCS and VPI

VPI Scales	VI	V	CCS Sub Scales			
			IV	III	II	I
1. Realistic(R)	.68*	.28*	-.13	.08	.18	.00
2. Investigative(I)	.04	.61*	.18	.08	-.07	-.13
3. Artistic(A)	-.19	.15	.68*	.24*	.08	-.02
4. Social(S)	-.03	.16	.26*	.55*	.28	.19
5. Enterprising(E)	.19	.13	.07	.29	.62*	.34*
6. Conventional(C)	.28	.09	-.17	.11	.33*	.53*
* P < .001			Average scale coefficient: .615			

The results of analysis presented in Table 1 shows that the scales on the VPI (a paper and pencil test) have a high positive relationship with those on CCS. An interpretation of concurrent validity for CCS is, in summary, that it assesses the traits of vocational personality (interest) validated through studies utilizing the Vocational Preference Inventory.

c. Construct Validity

Using a definition that the test measures the characteristics it claims to measure, construct validity was determined by assessing the

relationship of test scores to the theoretically related description of the job title of the respondent by which the score was generated.

Hypothesizing that workers stereotyped in one of the six (Holland) personality types would produce a maximum score on the CCS sub scale representing their occupational grouping, the actual and hypothetical scores were correlated to determine the nature of the relationship. The next Table reports the relationship of CCS sub scale (observed) scores and Work Environment (hypothetical) scores.

Intercorrelations Among the Scores
of 202 Workers Respondents to
CCS and Work Environment

CCS Sub Scores	Work Environment Scores					
	(R)	(I)	(A)	(S)	(E)	(C)
VI	.37*	-.06	-.22	-.21	.07	-.17
V	.04	.27*	-.12	-.13	.04	-.13
IV	-.33*	-.08	.57*	.20	-.15	.03
III	-.31*	.01	.19	.32*	-.00	-.06
II	-.12	-.24*	-.04	.05	.37*	.01
I	-.17	-.16	-.15	-.04	.18	.40*
* P < .001		Average r .398				

The results of analysis presented in the above Table shows a positive significant relationship between CCS sub scales and stereotypical work environments characterized through job descriptions. In summary, there is strong evidence that CCS measures the characteristics it purports to measure.

d. Sample Score Averages and Variability

In order to understand more fully the nature of the CCS scores produced by the stratified sample of workers, the following tables present the group size, the means, and the standard deviations of raw scores.

CCS Sub-Scale Means and
Standard Deviations for Respondents
from Realistic Work Environments (N=68)

Sub Scale	Mean	S.D.
VI	11.20	4.70
V	9.14	5.18
IV	5.42	3.82
III	6.70	3.88
II	6.92	4.66
I	6.86	4.36

CCS Sub-Scale Means and
Standard Deviations for Respondents
from Investigative Work Environments (N=30)

Sub Scale	Mean	S.D.
VI	10.26	4.10
V	12.46	5.60
IV	5.14	4.10
III	8.46	3.70
II	6.14	4.70
I	7.46	4.30

CCS Sub-Scale Means and
Standard Deviations for Respondents
from Artistic Work Environments (N=16)

Sub Scale	Mean	S.D.
VI	7.12	3.26
V	6.00	4.06
IV	16.50	5.20
III	6.50	2.58
II	3.00	2.32
I	5.76	2.52

CCS Sub-Scale Means and
Standard Deviations for Respondents
from Social Work Environments (N=38)

Sub Scale	Mean	S.D.
VI	7.94	3.82
V	8.36	5.04
IV	8.74	6.22
III	8.26	4.46
II	5.06	3.86
I	7.48	4.10

CCS Sub-Scale Means and
Standard Deviations for Respondents
from Enterprising Work Environments (N=30)

Sub Scale	Mean	S.D.
VI	8.98	5.18
V	9.64	4.04
IV	7.08	5.38
III	9.76	3.70
II	10.42	5.38
I	8.60	3.98

CCS Sub-Scale Means and
Standard Deviations for Respondents
Conventional Work Environments (N=20)

Sub Scale	Mean	S.D.
VI	8.36	5.20
V	6.82	4.36
IV	6.94	4.70
III	8.36	3.10
II	8.36	3.82
I	11.64	5.84

From an inspection of the tabled data it appears that the sub scale raw score results related to incumbents from specific work environments average larger than any other of the sub scales. The exception to this is Social. Further research will attempt to make the instrument more sensitive with that sample of workers.

Reliability

At the present stage of development no test-retest studies have been pursued to determine stability of the measure. As an indicator of reliability, item biserial coefficients of correlation with their respective sub scale scores were produced during the validation study with job incumbents. The coefficients ranged from .17 to 1.39 with a median coefficient of .63.

Sex and Racial Balanced Item Content

The portrayal of workers in the pictures of the CCS was balanced in-so-far as was possible so as not to influence stereotyping. The following table indicates this balance:

Item Relationships to Sex, Race, and Holland Typology as Portrayed in Worker Photographs

		Sub Scale (Holland Typology)						Total
Sex	Race	I	II	III	IV	V	VI	
Male	Caucasian	9	10	8	8	11	7	53
	Other	2	1	2	5	1	2	13
Female	Caucasian	11	11	5	8	8	7	50
	Other	2	0	5	1	3	1	12
Undistin- guishable	Caucasian	0	1	4	2	0	0	7
	Other	0	0	0	0	0	0	0
	Undistin- guishable	0	1	0	0	1	7	9
Total Item Count		24	24	24	24	24	24	144

Norm Table Development

A normative study of the Comparative Career Search was completed during the 1977-78 school year in Indiana. The subjects were 2504 female and 2908 male students in a sample drawn from a universe of all classrooms of students in public secondary schools in Indiana. The samples came from schools stratified by size, wealth of community, and curricular expenditure. In addition, the variables of sex, age, ability (perceived), interest (perceived) and personality (expressed) were reported by the subjects and used as dependent variables in the analysis.

The only variable which yielded significant and useful differences for norm development purposes was sex. For this reason normative results are tabled for separate use by males and females.

Stanine Results of CCS Norming
With Indiana Secondary Male Youth (N=2908)

Raw Score	Sub Scale					
	I	II	III	IV	V	VI
24	9	9	9	9	9	9
23	9	9	9	9	9	9
22	9	9	9	9	9	9
21	9	9	9	9	9	8
20	9	9	9	9	9	8
19	9	9	9	9	9	8
18	9	9	9	9	9	7
17	9	9	9	9	8	7
16	9	9	9	9	8	7
15	9	9	9	9	8	6
14	9	9	9	8	7	6
13	9	8	9	8	7	6
12	9	8	9	8	7	5
11	9	7	8	8	6	5
10	8	7	8	7	6	5
9	8	7	7	7	6	4
8	7	6	7	6	5	4
7	7	6	6	6	5	4
6	6	5	6	5	4	4
5	6	5	5	5	4	3
4	5	5	5	4	4	3
3	5	4	4	4	3	3
2	4	4	4	4	3	2
1	4	3	3	3	3	2
0	4	3	3	3	3	2

Stanine Results of CCS Norming
With Indiana Secondary Female Youth (N=2504)

Raw Score	Sub Scale					
	I	II	III	IV	V	VI
24	9	9	9	9	9	9
23	9	9	9	9	9	9
22	9	9	9	9	9	9
21	9	9	9	9	9	9
20	9	9	9	9	9	9
19	8	9	9	8	9	9
18	8	9	9	8	9	9
17	8	9	9	8	9	9
16	7	9	8	7	9	9
15	7	8	8	7	9	9
14	7	8	7	7	9	9
13	7	7	7	6	8	9
12	6	7	6	6	8	9
11	6	7	6	6	7	9
10	5	6	6	5	7	9
9	5	6	5	5	7	9
8	5	5	5	5	6	8
7	4	5	4	4	6	8
6	4	5	4	4	5	7
5	4	4	3	4	5	7
4	3	4	3	3	5	6
3	3	3	2	3	4	5
2	3	3	2	3	4	5
1	2	3	1	2	3	4
0	2	3	1	2	3	4

SUMMARY - MEASURING VOCATIONAL INTERESTS WITH THE COMPARATIVE CAREER SEARCH

In most educational systems, guidance personnel and other interested educators provide students with assistance in career planning. One of the resources for such planning is a vocational interest measure. One such instrument is the Comparative Career Search. Because it combines a paced set of instructions and background music, with a picture format for items, reading difficulties are negated. This increases motivation and involvement in the test and tends to produce more usable results.

The self scoring answer form provides immediate feedback of test results in work-applied terms. Both job incumbent and student results are built into the comparison format so that career exploration through community and school resources has a relevant base. The exploration can include schools, businesses, and labor operatives within the community. Calls and visitations by educational leaders can set the stage for important student exploration. Interviewing persons who work at local industries can provide youth with help in deciding on career directions. Literature about the history of the enterprise and the products or services rendered may also be a valuable resource.

NAME _____ DATE _____

SEX _____ GRADE _____ AGE _____ COUNTY _____

SCHOOL _____

COMPARATIVE CAREER SEARCH

A FILMSTRIP PROJECTOR, SCREEN, CASSETTE PLAYER, PENCIL, AND THIS ANSWER SHEET ARE REQUIRED TO COMPLETE THIS SURVEY.

DIRECTIONS: Fill in your name, date, sex, grade, age, county, and school.

(signal) This is a survey to assist you in discovering those jobs that interest you most. Your answer sheet has seventy-two (72) spaces for you to mark. (signal)

The film shows people at work. Two photographs are of persons doing *different* jobs. The drawings beside them are clues to the tasks they are performing. (signal)

During the survey, you will be asked to select your preference for the upper drawing and photograph—labeled A, or the lower pair—labeled B. (signal)

You will then mark your answer to show the choice of work you prefer—that is, either A or B. If you *cannot* decide, blacken in the (?) response space. (signal)

Begin

The pictures show people at work. Your choice—A or B—should *not* be influenced by the sex of the persons in the pictures, but by the work they are doing. (signal)

On the left side of the answer sheet is an example box. In a few moments, you will be using this box to mark your preference for three sample pictures. (signal)

Remember, if you prefer the kind of work pictured in A, blacken the response space below the letter A. If you prefer the kind of work pictured in B, blacken the B response space. If you cannot decide, you may blacken the (?) space. Mark *only one* response for each picture. You will have about 10 seconds to mark your choice for each of the next three pictures. (signal)

Do you have any questions? If you do, stop the sound until your questions are answered. If there are no questions, begin marking your responses to the next 72 pictures. Make certain the number shown in the picture is the same as the response number you are marking on your answer sheet. (signal)

DO NOT MARK IN THIS BLOCK

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

EXAMPLE BOX

A	B	(?)
X		
Y		
Z		

Use Pencil Only—Do Not Use A Pen Erase Any Mistakes Completely
Be Sure Each Mark Is Black And Completely Fills The Box

SIDE 1

1	13	25	37	49	61	A + B = TOTAL
2	14	26	38	50	62	▶ □ + □ = □ I
3	15	27	39	51	63	▶ □ + □ = □ II
4	16	28	40	52	64	▶ □ + □ = □ III
5	17	29	41	53	65	▶ □ + □ = □ IV
6	18	30	42	54	66	▶ □ + □ = □ V
7	19	31	43	55	67	▶ □ + □ = □ VI
8	20	32	44	56	68	
9	21	33	45	57	69	
10	22	34	46	58	70	
11	23	35	47	59	71	
12	24	36	48	60	72	

REFERENCES

Gottfredson, Linda S., An Analytical Description of Employment According to Race, Sex, Prestige, and Holland Type of Work, Report No. 249, Center for Social Organization of Schools, Johns Hopkins University, Baltimore, 1978.

Holland, John L. "A Personality Inventory Employing Occupational Titles," Journal of Applied Psychology, 1958, 42, 336-342.

"A Psychological Classification Scheme for Vocations and Major Fields," Journal of Counseling Psychology, 1966, 13, 278-288(a).

N.S. Cole and J.M. Richards, Jr. An Empirical Occupational Classification Derived from a Theory of Personality and Intended for Practice and Research - ACT Research Report No. 29, Iowa City: The American College Testing Program, 1969.

Explorations of a Theory of Vocational Choice: V.A. One-Year Prediction Study, Moravia, New York Chronicle Guidance Professional Service, 1964.

"Explorations of a Theory of Vocational Choice: VI, A Longitudinal Study Using a Sample of Typical College Students," Journal of Applied Psychology, 1968, 52, 1-37(b)

Making Vocational Choices: A Theory of Careers, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1973

Manual for the Vocational Preference Inventory, Palo Alto, California, Consulting Psychologists Press, 1965.

The Self-Directed Search, Palo Alto, California, Consulting Psychologists Press, 1972.

